

## WHAT IS CLAIMED IS:

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1. An article of manufacture comprising:  
a first container containing a liquid phase, the liquid phase  
comprising:  
peroxidic species or reaction products resulting from  
oxidation of an alkene by a mixture of ozone and oxygen,  
wherein the alkene has less than about 35 carbons;  
a penetrating solvent; and  
a second container containing a solid phase, the solid phase  
comprising:  
a dye containing a chelated divalent or trivalent metal;  
and  
an aromatic redox compound.
2. The article of manufacture of claim 1, wherein the alkene  
comprises an open-chain unsaturated hydrocarbon, a monocyclic unsaturated  
hydrocarbon, or a bicyclic unsaturated hydrocarbon.
3. The article of manufacture of claim 1, wherein the alkene  
comprises an open-chain unsaturated hydrocarbon, a monocyclic unsaturated  
hydrocarbon, or a bicyclic unsaturated hydrocarbon.
4. The article of manufacture of claim 1, wherein the alkene  
comprises an open-chain unsaturated alcohol, a monocyclic unsaturated alcohol,  
or a bicyclic unsaturated alcohol.
5. The article of manufacture of claim 1, wherein the alkene is an  
hydroxyl-containing alkene.
6. The article of manufacture of claim 1, wherein the alkene is in a  
liquid form, in a solution, or in a dispersion.

7. The article of manufacture of claim 1, wherein the alkene comprises an isoprenoid.

8. The article of manufacture of claim 6, wherein the isoprenoid comprises  $\alpha$ -terpineol, citronellol, nerol, phytol, menthol, linalool, geraniol, geranylgeraniol, or farnesol.

9. The article of manufacture of claim 6, wherein the isoprenoid comprises myricene, citrillene, citral, pinene, or limonene.

10. The article of manufacture of claim 1, wherein the alkene comprises fixed oil-, ester-, fatty acid-, or ether-containing olefin.

11. The article of manufacture of claim 1, wherein the oxygen-containing oxidizing agent comprises singlet oxygen, oxygen in its triplet state, superoxide anion, periodate, hydroxyl radical, peroxide, or oxygen bound to a transition element.

12. The article of manufacture of claim 1, wherein the oxygen-containing oxidizing agent comprises ozone.

13. The article of manufacture of claim 1, wherein the penetrating solvent is a liquid, micelle membrane, emollient, plasma, or vapor.

14. The article of manufacture of claim 1, wherein the penetrating solvent is dimethylsulfoxide.

15. The article of manufacture of claim 1, wherein the penetrating solvent is polyvinylpyrrolidone or a pH-buffered saline.

16. The article of manufacture of claim 1, wherein the penetrating solvent is aqueous solution, fats, sterols, lecithins, phosphatides, ethanol, propylene glycol, or methylsulfonylmethane.

17. The article of manufacture of claim 1, wherein the dye can be activated by an energy.

18. The article of manufacture of claim 1, wherein the dye comprises porphyrin or rose bengal.

5 19. The article of manufacture of claim 1, wherein the dye comprises chlorophyllin, hemin, corrins, texaphrin, methylene blue, hematoxylin, eosin, erythrosin, lactoflavin, anthracene dye, hypericin, methylcholanthrene, neutral red, or fluorescein.

10 20. The article of manufacture of claim 16, wherein the energy comprises photon or electroporation pulse.

21. The article of manufacture of claim 13, wherein the energy comprises laser, ionizing radiation, phonon, electrical pulse, magnetic field, plasma pulse, gravitational pulse, or continuous flow excitation.

15            22.     The article of manufacture of claim 1, wherein the metal comprises iron.

23. The article of manufacture of claim 1, wherein the metal comprises copper, manganese, tin, magnesium, or strontium.

24. The article of manufacture of claim 1, wherein the aromatic redox compound comprises benzoquinone or naphthoquinone.

20                    25.    The article of manufacture of claim 1 further comprising an  
electron donor.

26. The article of manufacture claim 24, wherein the electron donor comprises ascorbic acid or a pharmaceutical salt thereof.

25 27. The article of manufacture of claim 24, wherein the electron donor comprises plasma, electrical current or germanium sesquioxide.

28. An article of manufacture comprising:  
a first container containing a liquid phase, the liquid phase  
comprising:  
peroxidic species or reaction products resulting from  
oxidation of a hydroxyl-containing alkene by a mixture of  
ozone and oxygen, wherein the hydroxyl-containing  
comprises  $\alpha$ -terpineol, citronellol, nerol, linalool, phytol,  
geraniol, perillyl alcohol, menthol, geranylgeraniol or  
farnesol alkene by a mixture of ozone and oxygen; and  
a penetrating solvent, wherein the penetrating solvent  
comprises dimethylsulfoxide, sterol, lecithin, propylene  
glycol, or methylsulfonylmethane; and  
a second container containing a solid phase, the solid phase  
comprising:  
a dye containing a chelated divalent or trivalent metal,  
wherein the dye comprises porphyrin, rose bengal,  
chlorophyllin, hemin, corrins, texaphrin, methylene blue,  
hematoxylin, eosin, erythrosin, lactoflavin, anthracene  
dye, hypericin, methylcholanthrene, neutral red, or  
fluorescein; and  
an aromatic redox compound, wherein the redox compound  
comprises benzoquinone or naphthoquinone.
29. The article of manufacture of claim 27 further comprising an  
electron donor.
30. The article of manufacture of claim 28, wherein the electron  
donor comprises ascorbic acid or a pharmaceutical salt thereof.

31. A method for treating a patient with coronary arteriosclerosis comprising:
- administering to the patient an effective amount of a pharmaceutical formulation comprising:
- 5 peroxidic species or reaction products resulting from oxidation of an alkene by an oxygen-containing oxidizing agent, wherein the alkene has less than about 35 carbons;
- a penetrating solvent;
- a dye containing a chelated divalent or trivalent metal; and
- 10 an aromatic redox compound.
32. The method of claim 30, wherein the alkene comprises an open-chain unsaturated hydrocarbon, a monocyclic unsaturated hydrocarbon, or a bicyclic unsaturated hydrocarbon.
33. The method of claim 30, wherein the alkene comprises an open-chain unsaturated alcohol, a monocyclic unsaturated alcohol, or a bicyclic unsaturated alcohol.
- 15 34. The method of claim 30, wherein the alkene is a hydroxyl-containing alkene.
35. The method of claim 30, wherein the alkene is in a liquid form, in a solution, or in a dispersion.
- 20 36. The method of claim 30, wherein the alkene comprises an isoprenoid.
37. The method of claim 35, wherein the isoprenoid comprises  $\alpha$ -terpineol, citronellol, nerol, phytol, perillyl alcohol, menthol, linalool, geranylgeraniol, geraniol, or farnesol.
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38. The method of claim 35, wherein the isoprenoid comprise myricene, citrillene, citrala, pinene, or limonene.

39. The method of claim 30, wherein the alkene comprises fixed oil-, ester-, fatty acid-, or ether-containing olefin.

5 40. The method of claim 30, wherein the oxygen-containing oxidizing agent comprises singlet oxygen, oxygen in its triplet state, superoxide anion, periodate, hydroxyl radical, peroxide, or oxygen bound to a transition element.

10 41. The method of claim 30, wherein the oxygen-containing oxidizing agent comprises ozone.

42. The method of claim 30, wherein the penetrating solvent is a liquid, micelle membrane, emollient, plasma, or vapor.

43. The method of claim 30, wherein the penetrating solvent is dimethylsulfoxide.

15 44. The method of claim 30, wherein the penetrating solvent is polyvinylpyrrolidine or a pH-buffered saline.

45. The method of claim 30, wherein the penetrating solvent is aqueous solution, fats, sterols, lecithins, phosphatides, ethanol, propylene glycol, or methylsulfonylmethane.

20 46. The method of claim 30, wherein the dye comprises porphyrin or rose bengal.

25 47. The method of claim 30, wherein the dye comprises chlorophyllin, hemin, corrins, texaphrin, methylene blue, hematoxylin, eosin, erythrosin, lactoflavin, anthracene dye, hypericin, methylcholanthrene, neutral red, or fluorescein.

48. The method of claim 30, wherein the metal comprises iron.
49. The method of claim 30, wherein the metal comprises copper, manganese, tin, magnesium, or strontium.
50. The method of claim 30, wherein the aromatic redox compound comprises benzoquinone or naphthoquinone.
51. The method of claim 30 further comprising an electron donor.
52. The method of claim 30, wherein the electron donor comprises ascorbic acid or a pharmaceutical salt thereof.
53. A method for treating a patient with coronary arteriosclerosis comprising:  
administering to the patient an effective amount of a pharmaceutical formulation comprising:  
peroxidic species or reaction products resulting from oxidation of a hydroxyl-containing alkene by a mixture of ozone and oxygen, wherein the hydroxyl-containing comprises  $\alpha$ -terpineol, citronellol, nerol, linalool, phytol, geraniol, perillyl alcohol, menthol, geranylgeraniol or farnesolalkene by a mixture of ozone and oxygen;  
a penetrating solvent, wherein the penetrating solvent comprises dimethylsulfoxide, sterol, lecithin, propylene glycol, or methylsulfonylmethane;  
a dye containing a chelated divalent or trivalent metal, wherein the dye comprises porphyrin, rose bengal, chlorophyllin, hemin, corrins, texaphrin, methylene blue, hematoxylin, eosin, erythrosin, lactoflavin, anthracene dye, hypericin, methylcholanthrene, neutral red, or fluorescein; and  
an aromatic redox compound, wherein the redox compound comprises benzoquinone or naphthoquinone.
54. The method of claim 52 further comprising an electron donor.

5. The method of claim 53,  
acid or a pharmaceutical salt thereof.

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